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Professional Education Series

Support. Inform. Educate. Empower.

Nutrition Considerations for the Youth Athlete

TODAY'S AGENDA:

- Introduction & Housekeeping
- Speaker Introduction
- Presentation
- Q&A
- Closing



WEBINAR HOST:

Keith Hine, MS, RD

VP of Healthcare, Sports & Professional Education
Orgain, LLC



WEBINAR PRESENTER:

Laura M. Reece, MS, RD, CSSD, LDN

Board Certified Sports Dietitian (CSSD) specializing in sports performance based nutrition

Nutritional Considerations for the Youth Athlete

Orgain Webinar

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Female Athlete Program

Sports Medicine & Orthopedics

Owner, Laura Moretti Nutrition LLC



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What's on the menu?

1. Benefits of Sport Participation
2. What are We Up Against?
3. Growing and Developing Bodies
4. Energy Availability
5. Building an Athlete's Plate
6. Hydration Needs
7. Vitamins and Minerals
8. Nutrient Timing





Benefits of Sport Participation



Youth and Adolescent Sport Participation Health Benefits

- Increased fitness levels
- Greater bone density
- Lower blood pressure
- Reduced risk of cardiovascular disease
- Improved coordination
- Decreased depression/anxiety
- Improved confidence, character, emotional well-being
- Decreased drug use
- More positive body image



Silva G, et al. J Sports Sciences, 2013.

Kaestner R and Xu X. Evaluation Review, 2010.

The 2018 Tucker Center Research Report- Developing Physically Active Girls- An Evidence-based Multidisciplinary Approach.

Eime RM, et al. Behav Nutr Phys Act. 2013.

Youth and Adolescent Sport Participation Academic Benefits

- Moderate to vigorous physical activity and sport team participation are associated with higher GPAs/academic achievement
- NCAA athletes have a higher overall graduation rate than the general student population
- Women who play sport $\geq 3x/wk$ are 2x as likely to have a degree than non-sports playing women

Fox CK, et al. Journal of School Health, 2009.

Wretman. Journal of the Society for Social Work and Research, 2017.NCAA, 2018.

Rees, Daniel I. & Sabia, Economics of Education Review, 2010.

womeninsport.org



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What are we up against?

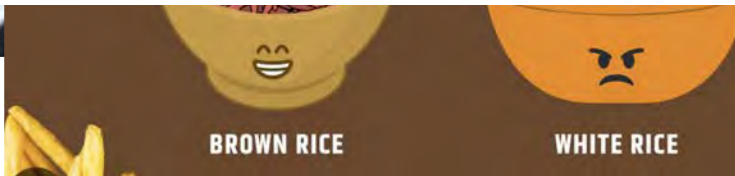
Hormone

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Health Class



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BROWN RICE

WHITE RICE

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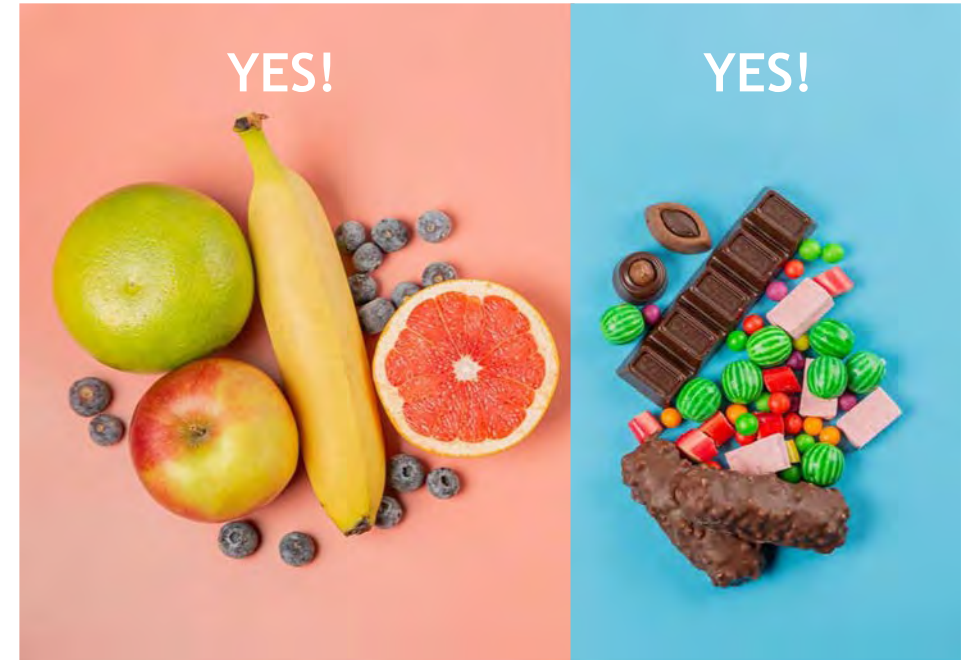
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Stressors Reported by Adolescent Athletes

Sport-Related Stressors	Organizational Stressors
Making physical or mental errors	Balancing schoolwork and sport training
Parent, teacher, coach criticisms	Travel for sports
Pressure to Perform	Day-to-day time management
Fear of Injury	

All Foods Fit!

- No “good” foods or “bad” foods
- No need to cut out food groups unless you have an allergy, food intolerance, or religious reason
- ENOUGH food is the MOST important thing!





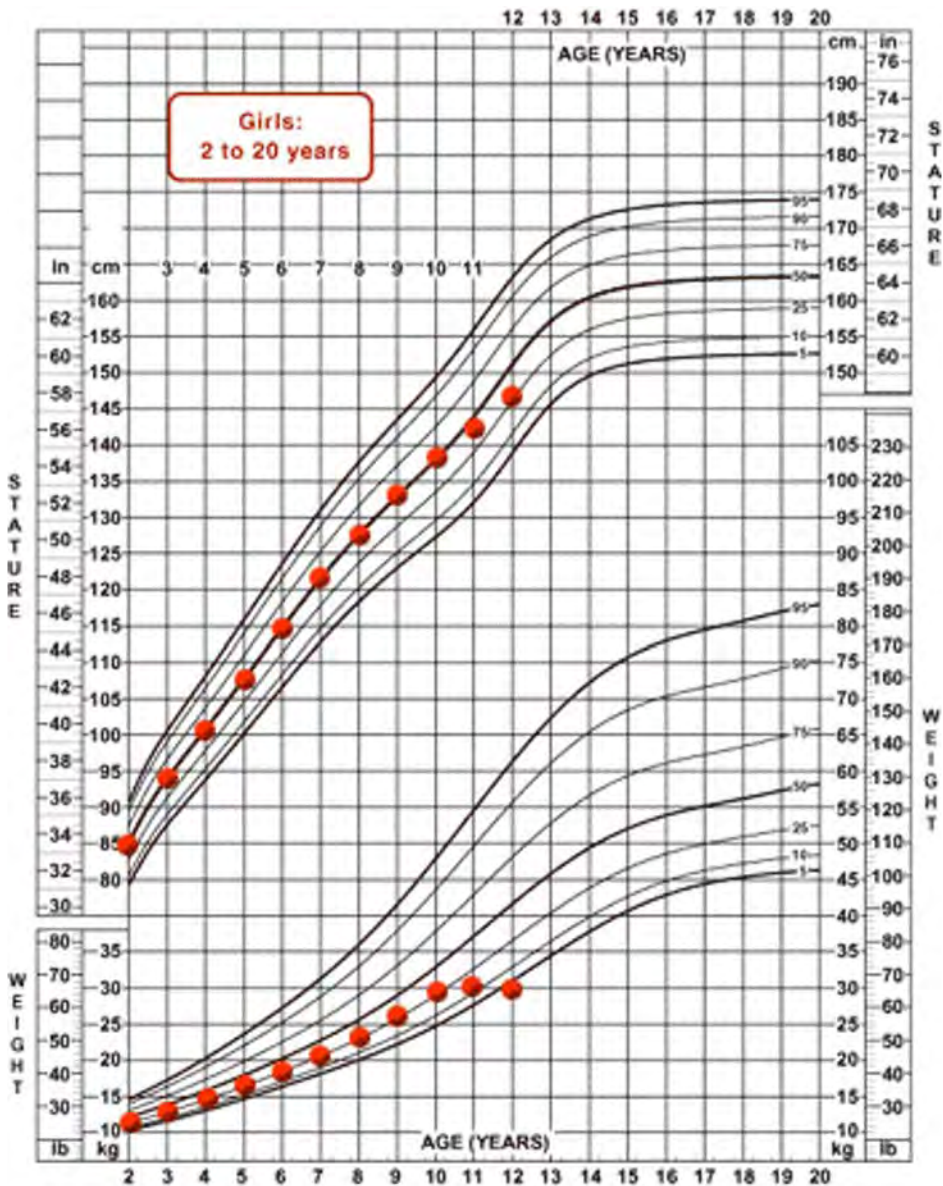
Growing and Developing Bodies



What is Going on During This Time?

- Altered body composition
- Metabolic and hormonal fluctuations
- Maturation of organ systems
- Establishment of nutrient deposits affecting future health outcomes
- Social/emotional development
- Sexual development
- Establishing lifelong relationship with food and body





<https://depts.washington.edu/growth/module7/text/page4a.htm>

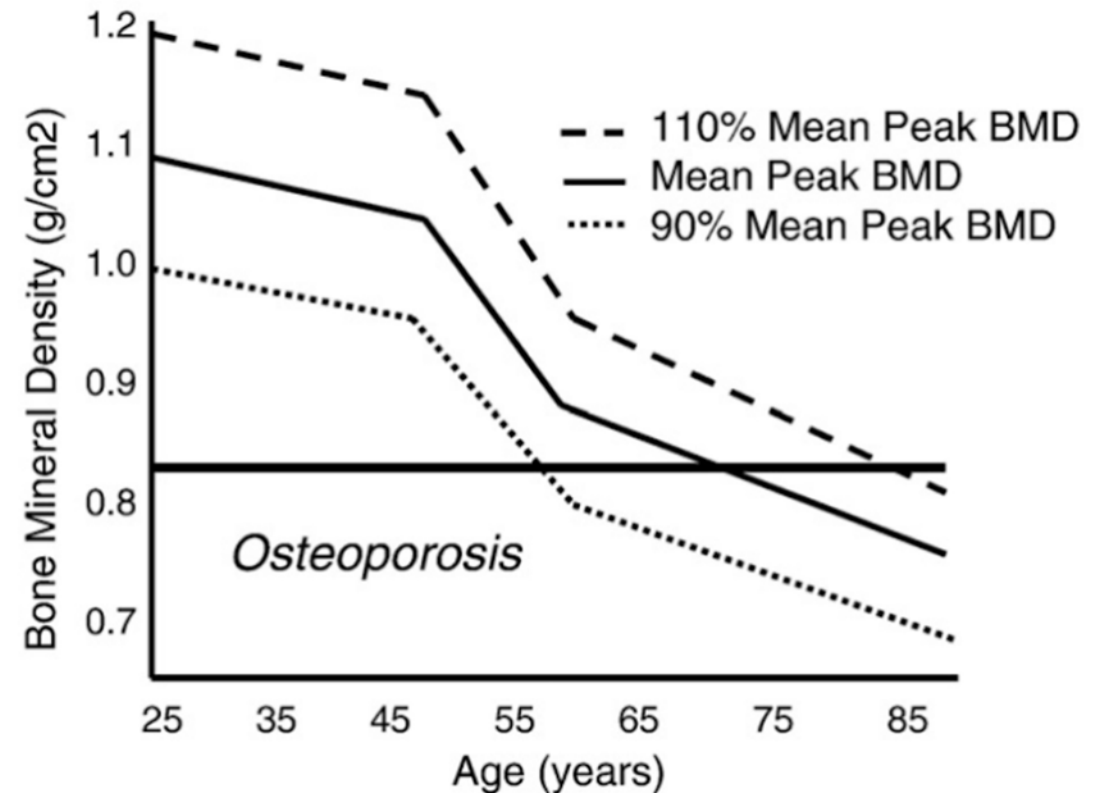
- Be weary of overemphasizing growth charts
- Be thoughtful/cautious around prescribing weight loss
- Risk of low energy availability or development of DE/ED
- Emphasize athlete's plate and fueling properly for activity and growth

Bone Mineral Density

90% of our peak BMD is built by age 18 > this is why ED/RED-S during these years matter!

Peak bone mass attained during this time is a determinant of developing osteopenia/osteoporosis & fractures later in life

If a young adult's BMD is 10% higher than the mean, it may delay the age of crossing the osteoporosis threshold by 13 years



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Weaver CM, et al. Osteoporos Int, 2016.
Lorentzon M, et al. J Bone Miner Res, 2005.
Barrack MT, et al. J Bone Miner Res, 2010.
Detter FT, et al. Calcif Tissue Int, 2013.
Gunter K, et al. J Bone Miner Res, 2008.



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Energy Needs During Adolescence

- Increased needs during adolescence optimal growth and development as well as substrate demands for activity
- No validated tools to show energy expenditure in youth athletes
- Accuracy of estimated energy requirement equations in adolescent populations is still fairly unknown
- Australian recommendations for energy based on predictive equations for REE
 - Schofield multiplied by an activity factor (NHMRC, NZMH, 2006)
 - Activity factors are broad and subjective in nature (use as a guide)



Energy Availability

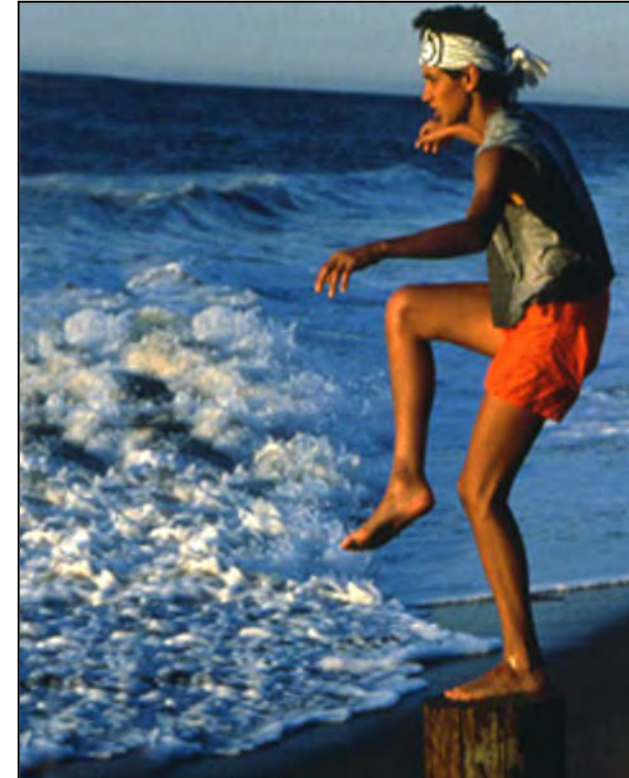


“You need to find a Balance”

Calories Consumed

- Training Calories

= Energy Availability



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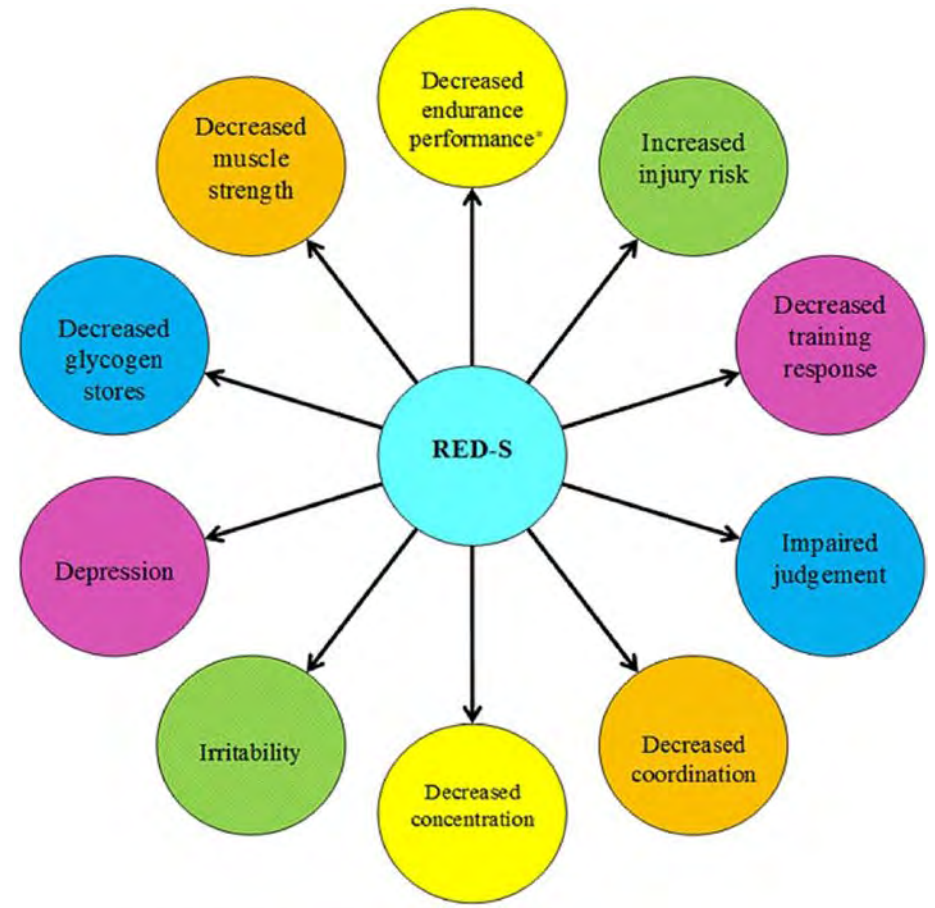
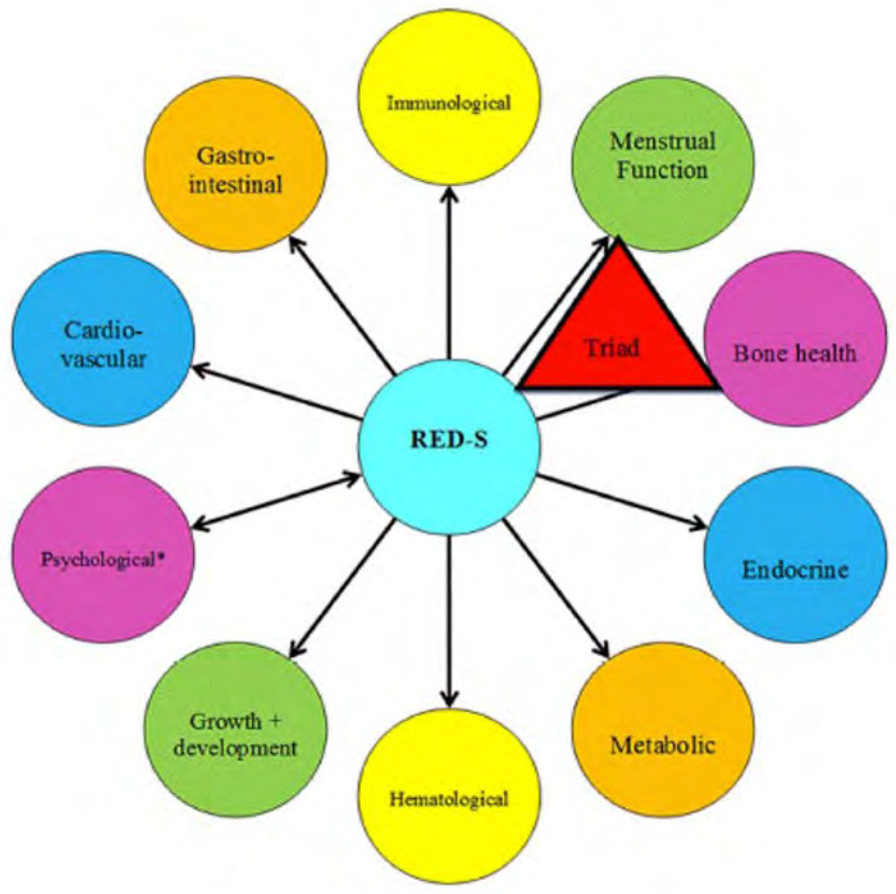
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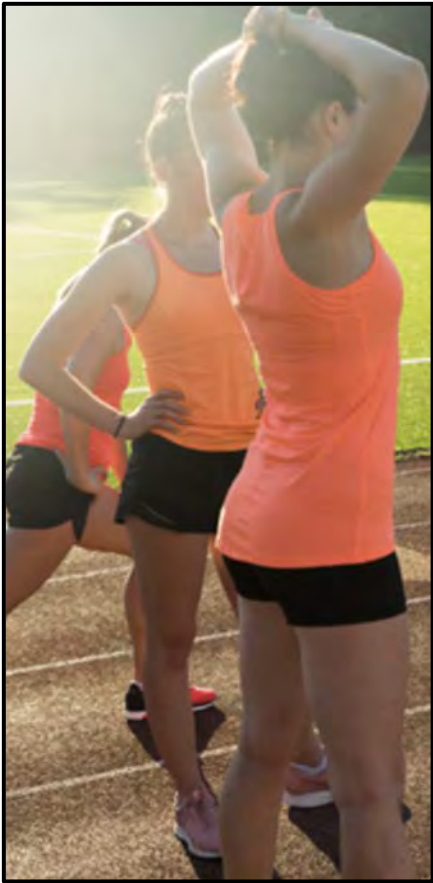


Relative Energy Deficiency in Sport (REDS)



Mountjoy M, et al. Br J Sports Med, 2014.

Prevalence of REDS in BCH Sports Medicine



- Survey of 1000 females presenting to sports medicine clinic (ages 15-30, ≥ 4 hrs/wk of exercise)
- Self Report of DE/ED, BEDA-Q, ESP
- 84.5% response rate
- Positive answers as surrogates for LOW EA/REDS

47.3%

Prevalence of Eating Disorders (ED) in Athletes

- Prevalence of DE/EDs is higher among athletes than non-athletes
 - female > male athletes
 - Higher risk among athletes in leanness sports
- 46% of elite females in leanness sports and 20% in non-leanness sports struggle with clinical ED
- Adolescent athletes may engage in restrictive diet and training strategies under the false belief that these efforts will help them reach optimal performance



Torveit et al
Bonci et al., 2008
Smolak L, et al. Int J Eat Disord, 2000.
Sigman GS. Pediatr Clin North Am, 2003.
Giel KE, et al. Int J Eat Disord, 2016.

Sundgot-Borgen J. Med Sci Sports Exerc, 1994.
Bergeron MF, et al. Br J Sports Med, 2015.
Martinsen M & Sundgot-Borgen J. Med Sci Sports Exerc, 2013.
Martinsen M, et al. Med Sci Sports Exerc, 2014.



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Fuel with Carbohydrates

- **Fastest & most readily-available** energy source
- Carbohydrates in food break down to glucose to be used or stored (liver and muscle)
- Protects against muscle breakdown
- Help support endurance performance
- Mixes results, but studies have shown adolescents under fuel with carbohydrates



Papadopoulou SK, et al. Int J Sport Nutr Exerc Metab, 2002.
Gibson JC, et al. Int J Sport Nutr Exerc Metab, 2011.
Baker LB, et al. Int J Sport Nutr Exerc Metab, 2014.

Slow Digesting vs. Fast Digesting Carbohydrates

Slow digesting carbohydrates:

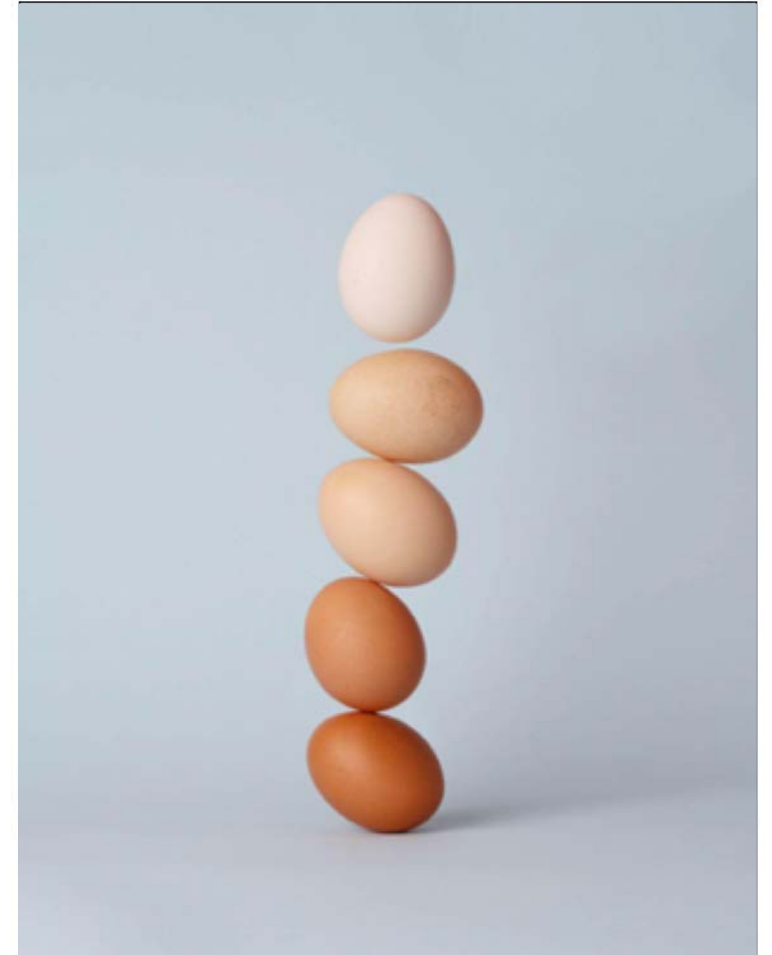
- Include protein and fiber
- Promote fullness and support gut health
- Can cause GI distress in high amounts
- Focus on these at meal time
- Ex: brown rice, multigrain/whole wheat products, oatmeal

Fast digesting carbohydrates:

- Little to no fiber
- Help with immediate energy
- Focus on these foods before/during/after sport
- Ex: white rice, pretzels, sports drinks, gummies

Protein

- Muscle development, strength, growth
- Emphasize maximum absorption rates
- Needs vary based on sport (generally 1.2-1.7 g/kg)
- Focus on whole foods, supplement when necessary and needed

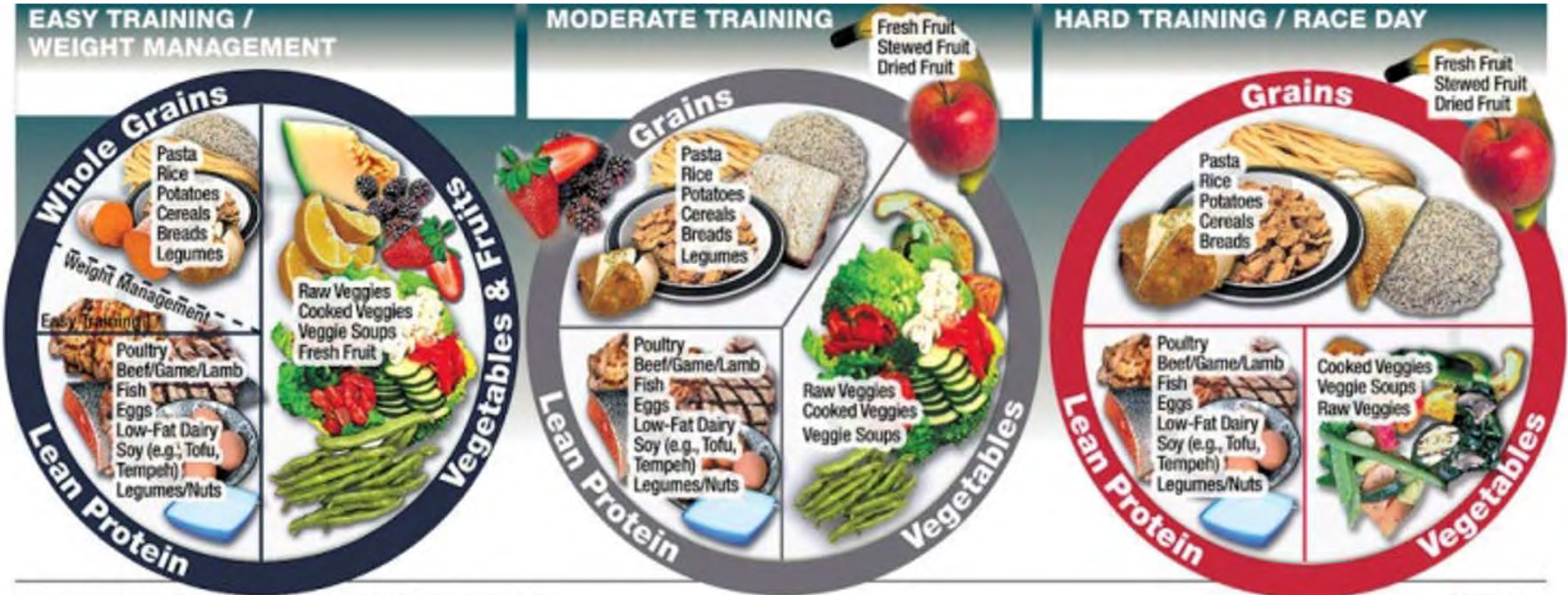




Fat

- SLOW energy source
- Works alongside carbs for energy
- Aids in absorption of Fat soluble vitamins (ADEK)
- Supports immune health & hormone production
- Fights inflammation (healing from injury)
- 1g/kg (minimum, never less than 20% total kcals)

Athlete Plates



SOURCE: United States Olympic Committee Sport Dietitians
University of Colorado Sport Nutrition Grad Program

JOURNAL



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Hydration Needs

FIGURE 2. AMERICAN ACADEMY OF PEDIATRICS HYDRATION RECOMMENDATIONS

Provide and promote consumption of readily accessible fluids at regular intervals before, during and after activity to offset sweat loss and maintain adequate hydration while avoiding overdrinking.

Encourage children to drink during activity to minimize sweat induced body-water deficits during exercise as long as pre-activity hydration status is good.

-9 to 12 years: 3-5 ounces every 20 minutes

-Older athletes: Up to 34-50 ounces per hour (9-13 ounces every 15 minutes)

Pre- and post-activity body weight measurements can provide more information for individual rehydration needs.

Electrolyte-supplemented beverages that emphasize sodium may be warranted during long duration (≥ 1 hour), repeated same-day sessions of strenuous exercise, sports participation and hot weather.

Educate children and adolescents of the merits of ample hydration.

Youth sports governing bodies, tournament directors and other event administrators should provide adequate rest and recovery periods of two or more hours between same day contests in warm to hot weather to allow sufficient recovery and rehydration.

REFERENCE: Council on Sports Medicine and Fitness and Council on School Health, Bergeron MF, Devore C, Rice SG; American Academy of Pediatrics. Policy Statement- climatic heat stress and exercising children and adolescents. Pediatrics. 2011; 128(3): e741-e747.



Hydration

AGE	MALES	FEMALES
9-13	2.4 liters = 10 cups	2.1 liters = 9 cups
14-18	3.3 liters = 14 cups	2.3 liters = 10 cups

Dietary Reference Intakes for water, potassium, sodium, chloride, and sulfate. www.nap.edu



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Sports Drinks vs. Water

- Water alone does not replenish electrolytes
- Sports drinks only necessary when activity is lasting greater than 60-90 mins or extreme conditions
- Can provide carbohydrates before/during to help maintain energy
- Sodium stimulates thirst which may promote hydration
- Food also helps replenish electrolytes



Sawka MN, et al. *ACSM Position Stand: Exercise and Fluid Replacement.* Medicine & Science in Sports & Exercise. 2007.



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Am I Hydrated?

Urine Color Chart



Dehydration:

- Decreases performance and focus
- GI distress
- Compromised blood flow to muscles
 - Reduced oxygen delivery to muscles= FATIGUE!

Suggested Guidelines:

- 2-3 hours prior to exercise- ~16-24 oz fluid
- 20-30 minutes prior: ~8-10 oz
- Individual needs based on sweat rate, age, heat



Vitamins and Minerals



Calcium + Vitamin D

- Promote bone health, decrease bone stress injury (BSI) risk, improve healing of BSIs, and aid in muscular contraction

- **Calcium:**

- Females/Males ≤ 18 yo 1300mg/d
- Can only absorb 500mg at a time
- 3 servings of dairy daily

- **Vitamin D:**

- ~800-1000 IU daily
- Sunlight also provides Vitamin D
- Special attention for athletes training mainly indoors (gymnasts, dancers, skaters)



IRON

Component of:

- Hemoglobin (blood) – carries oxygen in the blood
- Myoglobin (muscle) - makes oxygen available for muscular contraction

Who's at the greatest risk of iron deficiency

- Endurance athletes, females, vegetarians, vegans, runners

How much do I need?

- Females: 18 mg (18 + years)
- Males: 8 mg (8 mg)

How do I know if I am iron deficient?

- Confirm with blood test
- Signs/symptoms: fatigue/"heavy legs", bruise easily, cold intolerance



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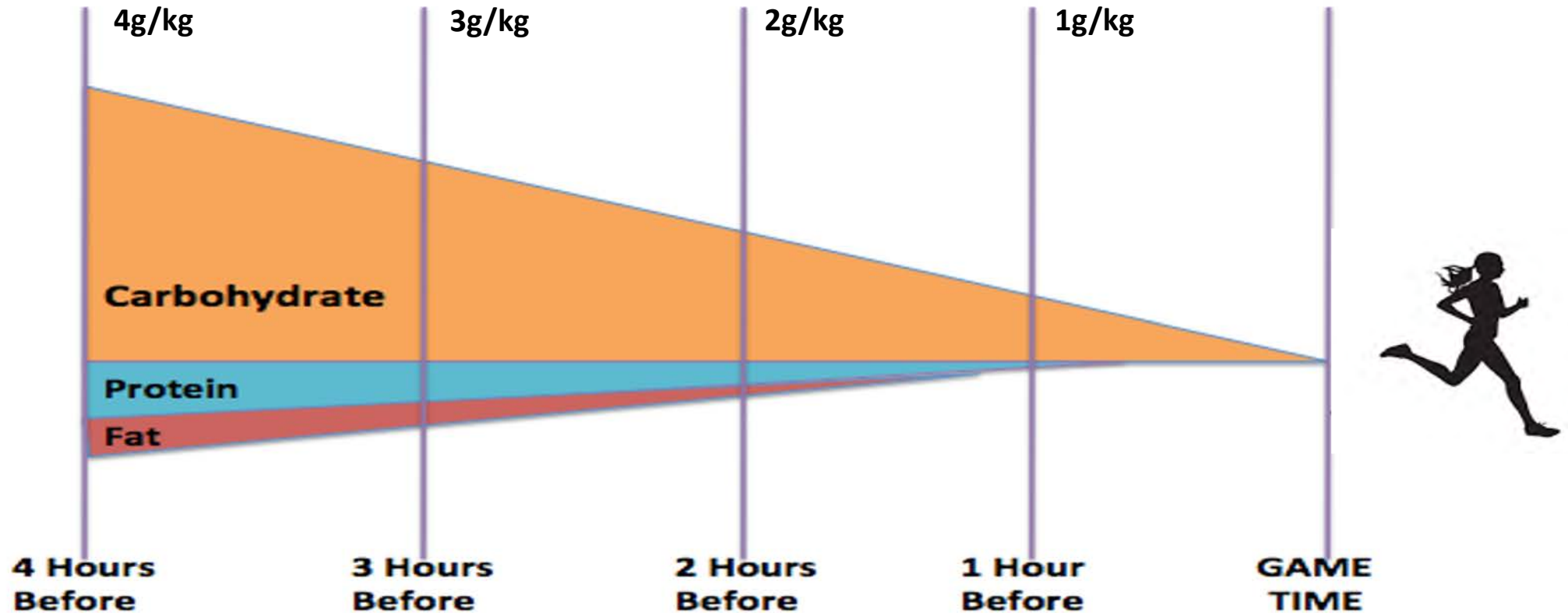


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Nutrient Timing

Pre-Activity Nutrient Timing



Recovery Nutrition

- Within **30-45** post game/practice aim to have a snack or meal with carbohydrates and protein to improve recovery
- Starting place: 20-30g carbs, with 10-15g protein



Focus on the 3 R's:
REFUEL
REPAIR
REPLENISH

Pre/Post Workout Fueling

Pre-Workout: Mostly Carbs

- Granola Bar
- PB Toast with Banana
- Apple Sauce and Pretzels
- Goldfish
- Low Fiber Dry cereal
- Oatmeal
- Sports Drinks

Post- Workout: Carb + Protein

- Chocolate Milk
- Smoothie (milk + fruit)
- Graham Crackers and peanut butter
- Yogurt with Granola
- Sandwich (with protein!)
- Hummus and crackers

Tournament Fueling

The Night Before:

- Utilize the athlete plate models
- Carbohydrate based meal
- Hydration (not just water!)

Game Day!

- Timing, timing, timing
- If less than an hour, focus on easily digested carbohydrates
- Pack foods, do not rely on there to be food at the tournament
- Hydration planning (electrolytes!)



General Takeaways

- More research on youth and adolescent athletes is needed!
- Growth and development during youth/adolescence can have long term impacts
- Education for athletes, coaches, practitioners, and parents is **KEY**

THANK YOU!

Boston Children's Hospital Sports Medicine/Female Athlete Program

- femaleathleteprogram@childrens.harvard.edu
- www.childrenshospital.org/programs/female-athlete-program
- www.femaleathleteconference.com

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